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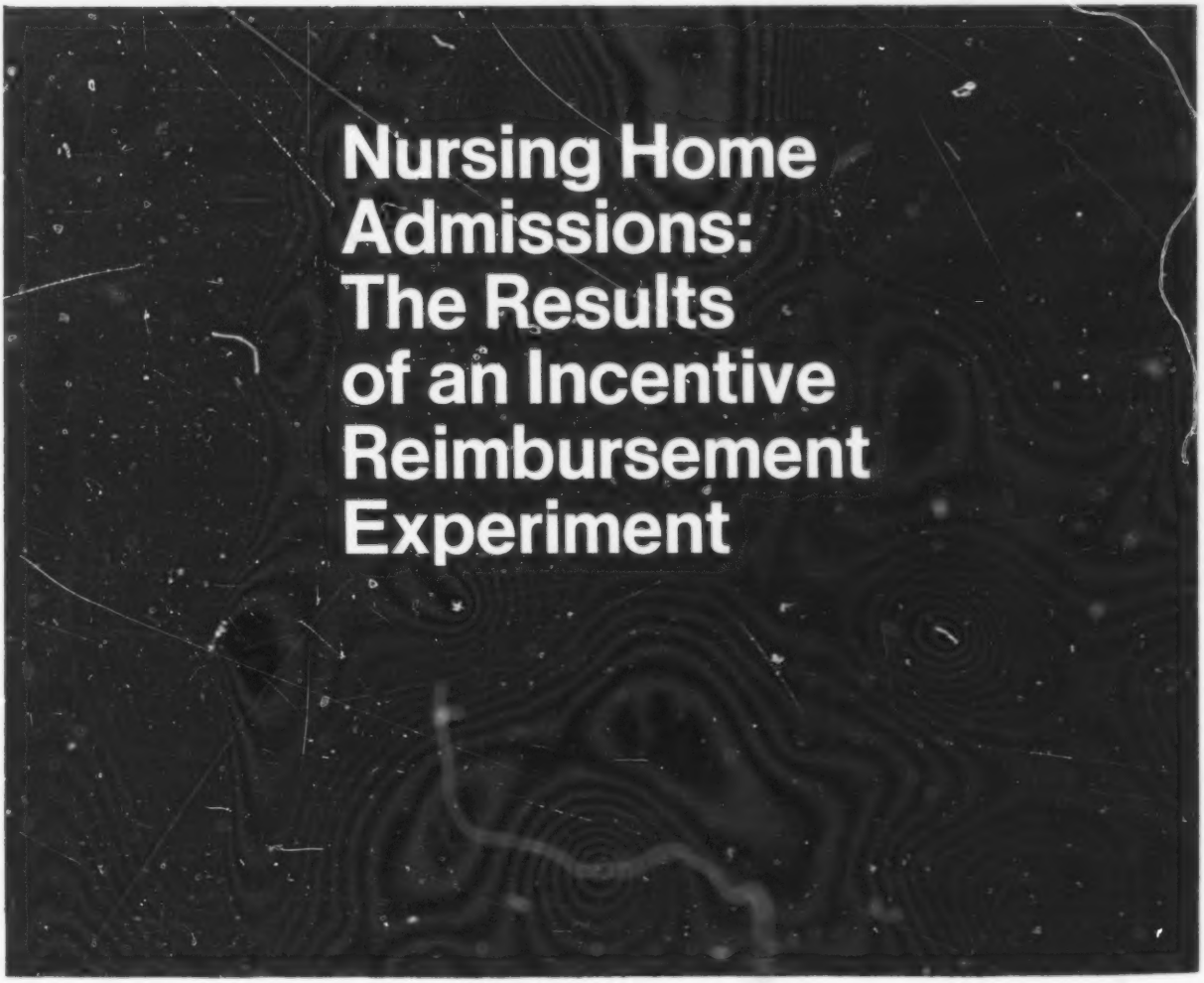

Nursing Home Admissions: The Results of an Incentive Reimbursement Experiment

Long-Term Care Studies Program
Research Report

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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Background

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Additional information on the intramural research program is available from the National Center for Health Services Research and Health Care Technology Assessment, 3-50 Park Building, Rockville, MD 20857; 301/443-2560. Inquiries may be directed to the Health Services for the Aged Studies Program or to the Long-Term Care Studies Program.

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Health Care for the Aging Research Reports present findings from studies conducted by the Long-Term Care Studies Program and the Health Services for the Aged Studies Program, components of the Division of Intramural Research, National Center for Health Services Research and Health Care Technology Assessment (NCHSR). This series presents information useful to those making administrative or policy decisions on matters related to long-term care or the general problem of health care for the elderly.

Overview

With improvements in medical technology and an increase in life expectancy, there also has been a substantial increase in the number of individuals with chronic diseases. Policy research now being conducted by the NCHSR intramural research program is concerned with defining the dimensions of the problems of caring for the chronically ill and identifying various approaches to organizing, financing, and delivering acute and long-term care services. The chronically ill elderly, who absorb an ever-growing proportion of our public and private resources, are of particular concern.

The intramural research program is concerned specifically with such problems as:

- the size and sources of our expenditures for long-term care
- the feasibility of alternative financing and reimbursement strategies
- the factors that affect the demand for and use of long-term care services
- the types of care that might be required for particular levels of functional disability
- the cost and economic implications of informal support systems
- the organization and coordination of social and medical services
- the economic and social implications of alternative health care and living arrangements.

This research report presents findings from a major demonstration and evaluation project which studied the consequences of using incentive payments to change admission and treatment patterns for Medicaid patients in nursing homes. In this experiment incentive payments were provided:

- to encourage nursing homes to admit highly dependent Medicaid residents who might otherwise be hospitalized inappropriately
- to improve the nature of the care provided by the nursing home by setting target outcome goals for specific patients and by establishing formal treatment plans for achieving these goals
- to encourage more appropriate discharges by encouraging institutions to provide case-management services, and by paying additional sums in situations in which discharge resulted from improved care.

An incentive-payment system was developed to reward facilities for achieving the various admission, treatment and discharge objectives. The experiment was carried out in 36 proprietary, Medicaid-certified, skilled nursing homes in San Diego County. These nursing homes had a combined Medicaid inpatient census of about 3,600 residents. The experiment lasted 30 months. The first six months (November 1980 through April 1981) provided baseline data on the nursing homes, their residents, and their methods of operation. Homes were subsequently assigned to either a control group or a treatment group. During the next two years (May 1981 through April 1983) an incentive reimbursement system was employed in paying for care in nursing homes included in the treatment group.

Data collecting, training and supervising a local field team of qualified geriatric nurses, and disbursing incentive payments to the nursing homes were the responsibilities of Applied Management Sciences, Inc. (funded by contract OASH 233-79-3019). All participating nursing homes were required to sign subcontracts with the contractor guaranteeing provision of data and accepting the incentive reimbursement system as well as judgments made by the local field team on authorization for payment to the treatment homes.

Admission, discharge, assessment, goal setting and care planning of residents remained the responsibility of the nursing homes. The contractor's local field team authorized:

1. Incentive payments on behalf of Medicaid residents according to the study's resident-classification system,
2. Outcome-incentive payments for eligible residents who successfully achieved

previously approved care goals, and

3. Discharge-incentive payments on behalf of residents who were discharged and maintained at lower levels of care for at least 90 days.

The incentive-payment system was designed to achieve each of the study's objectives; that is, an admission incentive was paid to encourage homes to admit sicker Medicaid residents who required above average care; an outcome incentive was paid to encourage homes to expand their nursing care services; and a discharge incentive was paid to encourage appropriate discharges and to provide case-management services.

The reimbursement system adhered to a number of basic principles:

1. All incentive payments were paid in addition to the Medicaid reimbursement.

2. Current Medicaid residents as well as new Medicaid admissions (or residents converting to Medicaid) were eligible for incentive payments.

3. Admission-incentive payments were paid on a monthly basis, outcome-incentive payments were paid on a quarterly basis, and discharge-incentive payments were prorated on a monthly basis following discharge.

4. Admission-incentive payments were paid on a prorated basis for residents who died or were transferred to a hospital because of an unavoidable change in health status.

5. The amount of the admission-incentive payment was not decreased as the resident improved; an increase was effective for the quarter following an unavoidable decline in health status.

6. Admission-incentive payments continued for three years beyond the end of the demonstration period for residents admitted during the first year of the treatment period.

The admission-incentive payments were computed based on the mean time per patient day required for each nursing care activity. This mean time was linked with a composite wage, which was weighted by the skill mix of nursing home staff delivering the care of service, to arrive at the mean nursing costs. The payments were designed to compensate for the costs of heavy-care patients which exceeded the amount paid by Medicaid.

The computation of the outcome-incentive payment was based on:

1. The basic services required in order to achieve the goal

2. The mean time required to perform the services

3. The skill mix of nursing personnel involved in service delivery and their composite hourly wage, and

4. The average number of days needed to achieve the goal.

The discharge-incentive payment rates include two components, vacant beds and staff effort. Since the vacant bed costs varied by a facility's bed capacity, two discharge-incentive rates were set based on the Medicaid SNF-bed rates that went into effect at the time of the study. The incentive payment covered up to 10 days of vacant bed cost for a timely discharge. The staff effort component of the incentive payment was intended to cover the cost of discharge planning, coordinating, and follow-up.

This report presents the results of the admission-incentive component of the study. Other reports in this series will provide data and analysis on other aspects of the research project.

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Nursing Home Admissions: The Results of an Incentive Reimbursement Experiment

Mark R. Meiners, Phyllis Thorburn, Pamela C. Roddy, and Brenda J. Jones

Public dollars comprise a significant share of health care expenditures in the United States (42 percent in 1983) and the way those dollars have been spent has had an important role in shaping the Nation's health care system. The results have not always been satisfactory, prompting interest in trying different approaches. Medicaid, as the primary payor for nursing home care in the United States, has provided a rich source of experience with reimbursement system experimentation.

Since the early 1970s, there has been a continued interest in new reimbursement approaches. This interest has been stimulated by the fact that each state has the right, within certain general limits, to determine how to pay its nursing homes under the Medicaid program. Since rapidly rising Medicaid expenditures for nursing home care have been a continuing and costly problem for states, there has been an active interest in reimbursement system experimentation.

Much of the early development focused on cost-containment strategies. Gradually, the states moved away from the cost-based reimbursement approach used by Medicare because it was too open ended. Today the majority use prospective facility-specific, rate-setting methods with ceilings limiting the amount that will be paid *(1)*.

The emphasis on nursing home cost containment has generated other problems requiring new solutions. For example, case-mix reimbursement systems are being tried in a few states to eliminate the financial disincentives to admit the heavy-care patients that exist when the payment system does not recognize different levels of complexity in patient care needs *(2)*. An underlying motivation is still cost containment since heavy-care patients often remain unnecessarily hospitalized when they cannot be placed in a nursing home.

The lack of incentives to produce positive outcomes, including discharge to lower levels of care when appropriate, also is a recognized problem of current nursing home reimbursement systems. Improving the quality and appropriateness of nursing home care through the reimbursement system has only recently been considered. Most states have avoided such initiatives because they expect them to increase costs with uncertain returns for the investment.

Both case-mix and outcome-based incentive reimbursement systems have been proposed for nursing homes as better alternatives to the approaches currently in use by most states, yet there is little evidence as to how such systems might work *(3,4)*. In order to obtain such information, the National Center for Health Services Research and Health Care Technology Assessment, with the cooperation of the Health Care Financing Administration, undertook a demonstration research project to test the efficacy of a reimbursement system for Medicaid nursing homes which combined elements of case-mix and outcome incentives.

The primary objective of the study was to encourage nursing homes to admit highly dependent Medicaid patients who might otherwise remain inappropriately hospitalized, thus incurring unnecessarily high costs for care. An incentive payment system that rewarded facilities for achieving this objective was devised and tested using a controlled experiment research design. The admission incentive payment system and the results it achieved are the topic of this report.

Two additional objectives, designed to complement the admission objective, also were emphasized with special incentive payments; these objectives were to improve patient outcomes through patient-specific goal setting and care planning and to encourage appropriate discharges through case management services provided by the home, thus freeing beds for more severely dependent patients. The details and results of these components of the study are discussed in two other reports in this series *(5,6)*.

The results of this study suggest that incentive reimbursement can influence nursing home behavior. The results also give a renewed sense of the limits of social experiments. It is difficult to simulate in an experimental setting the likely response to a change in a major government program because the information flow generated by discussions among interest groups, in the mass media, and in specialized industry publications is much more limited than would occur if the change were permanent and widespread. An experiment which affects nursing home behavior for an entire year is viewed as a long-term commitment by the research organization. To the participants, however, it may seem of very brief duration and there may be reluctance to make staffing, policy, and organizational changes which could affect their environment long after the experiment is concluded. Also, there are few opportunities in an experiment to make small adjustments and to monitor the results, whereas repeated fine tuning of reimbursement formulas is always a possibility with

ongoing programs. Given these limitations, the study results are encouraging for case-mix-based incentive reimbursement for nursing homes. The experiment provides valuable insights on how this type of approach to nursing home reimbursement might work and serves as a basis for further research and development.

The experiment

In an attempt to demonstrate that a reimbursement system could be established that would significantly alter nursing home admission practices by increasing the number of heavy-care patients, an experimental payment system for Medicaid patients was implemented in proprietary skilled nursing facilities (SNFs) in San Diego County, California. (The Medicaid program in California is called MediCal. This report uses the more general term, Medicaid, when referring to the patients paid for by that program.)

Primary consideration in site selection was internal validity. That is, the objective was to maximize the chances of determining whether or not "the experimental treatments make a difference in the specific experimental instance" *(7)*. Consideration was also given to SMSAs wholly contained within state boundaries. SMSAs located within proximity to other SMSAs (in terms of automobile travel time) were excluded so as to ensure a clear focus on the local health facility industry which may be affected by the research study. Additionally, practical considerations were taken into account. The California Department of Health Services and the California Association of Health Facilities and its San Diego affiliate were keenly interested in the study and helped to get the project under way.

Proprietary facilities were the focus for the study because they comprise about four-fifths of the nursing home industry and are theoretically more likely to be responsive to financial incentives than nonprofit nursing homes. The study was undertaken in skilled nursing facilities because they are the most likely source of alternative placement for patients requiring extended heavy care. In San Diego, as in the rest of California, most Medicaid-certified nursing homes are classified as skilled nursing facilities; in 1980 more than 90 percent of all Medicaid nursing home days in California and 86 percent of those in San Diego County were in SNFs.

Of the 41 proprietary SNFs in San Diego County, 36 agreed to participate in the study. These facilities accounted for about 70 percent of all Medicaid SNF patients in the county. These facilities were stratified by location, common ownership, and number of Medicaid admissions over a 3-month period. A random matched block design was used to allocate a facility to either a control group or an experimental group.

An extensive assessment instrument, which collected not only the information needed to classify for incentive payment purposes, but substantial additional data needed for research purposes, was administered to Medicaid-eligible admissions in treatment and control homes over an 18-month period (November 1980—April 1982). The core of the instrument was a series of questions on individual patient performance with regard to specific activities of daily living (eating, bathing, dressing, toileting, transferring, and continence), and the need for special nursing conditions (Stage III or IV decubitus, comatose or quadriplegic care, and tube feeding), which were used to classify patients for incentive payment purposes. Activities of daily living (ADL) is a frequently used measure of dependency and the need for care *(8)*. The special nursing conditions were those believed by both the nursing home industry representatives in California and the researchers to add substantially to the time (and therefore cost) required to care for patients. Consequently, Medicaid patients with these problems had a difficult time gaining access to nursing home beds. Table 1 shows the patient classification system in full.

These patient classification categories had to be converted into a rate structure for payment purposes. The approach taken was to use information on staffing patterns mandated by the state to estimate the amount of time available to care for the average patient. Using work sampling methods, it was determined that a Type C patient (a patient dependent in five activities of daily living) was the "break-even patient," the patient whose ADL needs the facilities were, on average, staffed to meet and for whom the Medicaid payments covered the costs. No additional reimbursement was deemed necessary for these patients. However, for heavier-care patients (Type D and E) an additional payment of "incentive" was paid to the facility, based on the amount of nurse aide time, over the average, that was required to care for these patients, as determined by the work measurement study.

For Type B patients with fewer ADL dependencies than the Type C patient, a negative "payment" was

Table 1. Admission classification system characteristics and incentive payment schedule (NCHSR Nursing Home Incentive Reimbursement Study).

Admission classification type	Number of dependencies in activities of daily living	Types of special nursing services needed	Daily incentive payment rate
Discharge likely within 90 days			
A	†	†	0
Discharge not likely within 90 days			
B	1-4	None	-$2.50
C	5	None	0
D	6	None	4.96
E 1	1-4	Tube feeding	7.28
E 2	1-4	Decubitus care	8.06
E 3	1-4	Comatose care	3.43
CE 1	5	Tube feeding	7.28
CE 2	5	Decubitus care	10.69
CE 3	5	Comatose care	6.06
CEE 1-2	5	Tube feeding and decubitus care	17.97
CEE 1-3	5	Decubitus and comatose care	11.59
DE 1	6	Tube feeding	9.90
DE 2	6	Decubitus care	15.65
DE 3	6	Comatose care	11.01
DEE 1-2	6	Tube feeding and decubitus care	20.59
DEE 1-3	6	Tube feeding and comatose care	15.96
DEE 2-3	6	Decubitus and comatose care	21.70
DEEE 1-3	6	Tube feeding, decubitus and comatose care	26.65

Note: Patient classification system types excluded from the table (*e.g.* CEE 2-3) did not occur during the course of the study. †Patients were classified as Type A by virtue of being considered dischargeable within 90 days; ADL dependencies and use of special services were not relevant.
Source: National Center for Health Services Research and Health Care Technology Assessment. Long-Term Care Studies Program.

made to offset the implicit overpayment in the actual Medicaid payment rate and to balance the incentive system. The negative payment for Type B patients was not actually deducted from the basic Medicaid rate but rather was subtracted from incentive payments earned for heavier-care patients.

Type A patients were not included in the incentive system, on the grounds that short-stay patients typically had no difficulty in gaining access to nursing homes, and were therefore not an appropriate target for incentive payments. This assessment was based on the research team nurses' judgment that the patient could be properly cared for in a lower-care environment or that the patient only required short-term rehabilitation after an acute care episode.

Table 1 gives the full schedule of payments, which were made each day the patient spent in the facility. In general, Type E patients—those who, in addition to ADL dependencies, required special nursing services—were reimbursed at the higher levels. For these patients incentive payments in addition to the flat-rate Medicaid payment ($35.26 to $37.81 per day at the beginning of the study) ranged from $3.43 to $26.65; the average was $12.32. If one were to ignore the amount of care these patients needed and focus only on the absolute level of payment, Type E patients were, on average, more remunerative than Type D patients. Type B patients were the patients for whom money was lost. There was no payment for Type A or Type C patients, but for different reasons. Type A patients were deemed outside the system whereas Type C patients were the break-even patient for whom no incentive was offered.

Table 2. Percent distribution of Medicaid admissions of patient Types B-E[1] during baseline and treatment periods, by experimental and control facilities (NCHSR Nursing Home Incentive Reimbursement Study).

Admission type	Baseline period, months 1-6		Treatment period, months 7-12		Treatment period, months 13-18		
	Experimental	Control	Experimental	Control	Experimental		Control
B	23.4	21.3	20.0	25.3	17.5	**	25.1
C	32.5	36.4	34.7	38.7	34.0		35.5
D	33.0	33.2	33.2	27.1	31.5		32.9
E	11.1	9.1	12.2	8.9	17.0	**	6.6
Sample size	449	464	395	462	371		487
	$X^2 = 2.42$		$X^2 = 8.45$*		$X^2 = 26.4$**		

[1]Admission type is established by assessing the patient's potential for discharge within 90 days, together with ADL dependencies and use of special services. See Table 1 for detail on the patient classification system used in the study. *Difference between experimentals and controls significant at the .05 level. **Difference between experimentals and controls significant at the .01 level.
Source: National Center for Health Services Research and Health Care Technology Assessment. Long-Term Care Studies Program.

Several points should be made about this system. First, although a separate set of incentive payments was made in addition to the flat-rate Medicaid payment, it was not in principle different from a single graduated payment scale. The rates were determined with reference to the time available in all treatment facilities to care for an average patient; no judgment was made that this amount of time was appropriate in order to provide quality care. "Time available" was determined on the basis of licensure requirements for all staff and the total number of beds, even though the system was applied only to Medicaid patients. In general, the reimbursement level was determined by the patient's classification at the time of admission; the facilities were, in effect, penalized if patients deteriorated. One exception was made. If a patient suffered an unavoidable accident or acute episode, (stroke, heart attack, or kidney failure) the facility could apply to have the patient's classification for reimbursement revised. However, if a patient improved, the admission incentive payment was not decreased, in effect rewarding the facilities for this achievement.

A fuller account of the design of the experiment has been published elsewhere *(9)*. The documentation of the data collection procedures is also contained in a separate report *(10)*. In the following sections, the results of the experiment are examined from several alternative perspectives.

Admission components

The focus of the study was on Medicaid admissions expected to have a stay of more than 90 days (Types B-E). The effect of the incentive payments on the distribution of these admissions is examined in Table 2. The data are arrayed for the experimental and control facility group during three 6-month periods: baseline (months 1-6) and the two halves of the treatment year (months 7-12 and months 13-18).

The treatment year was separated into two periods for analytical purposes. This separation was made because it was believed that the earlier part of the treatment period might not be representative of an ongoing system; that is, the facilities might not immediately adjust their policies to the new system. Furthermore, the second period covers the same six months as the baseline period, exactly one year later, so seasonal effects in admission patterns are controlled. To analyze whether the experimental and control facility admission patterns within a period were statistically different, Chi-squared test statistics were calculated. If the patterns were found to be different, t-test statistics were calculated to determine whether the difference was attributable to specific types of admissions.

Although the experimental and control groups did not have identical admission patterns during the baseline, the apparent difference is not statistically significant. During the first half of the treatment period, however, the admission patterns were different, although the differences for specific types of admissions were not large enough to be statistically significant at the .05 level. However, it is noteworthy that the experimental group admitted had a smaller proportion of Type B patients than the control group, reversing the baseline pattern. Also, the proportion of Type D patients admitted to the exeri-

Table 3. Percentage point differences for Medicaid admissions of patient Types B-E[1], between baseline period (months 1-6) and two treatment periods, by experimental and control facilities (NCHSR Nursing Home Incentive Reimbursement Study).

Admission classification type	Treatment period, months 7-12 compared to baseline		Treatment period, months 13-18 compared to baseline	
	Experimental	Control	Experimental	Control
B	−3.4	4.0	−5.9*	3.8
C	2.2	2.3	1.5	−0.9
D	0.2	−6.1	−1.5	−0.3
E	1.1	−0.2	5.9**	−2.5
	$X^2 = 1.59$	$X^2 = 4.81$	$X^2 = 8.66$*	$X^2 = 3.35$

[1]Admission type is established by assessing the patient's potential for discharge within 90 days, together with ADL dependencies and use of special services. See Table 1 for detail on the patient classification system used in the study. *Significant at the .05 level. **Significant at the .01 level.
Source: National Center for Health Services Research and Health Care Technology Assessment. Long-Term Care Studies Program.

mental facilities was higher than in the control facilities. However, the difference appears to be from a drop in the percentage of Type D patients admitted by the control facilities rather than an increase in admissions of Type D patients in the experimental facilities.

During the second half of the treatment period, there is a statistically significant difference between the admission patterns of the experimental and control facilities, and the difference can be attributed primarily to differences in Type B and E admissions. The percentage of Type E patients in the experimental group's admissions is more than twice that found in the control group. The percentage of Type B admissions in the experimental facilities declined to about the same percentage as Type E patients.

The pre-test and post-test differences in the admission patterns are examined in Table 3. For the experimental facilities, there is no significant difference between the distribution of admissions during the first half of the treatment period and the baseline period. The experimental group's admission distribution in the second half of the treatment period, however, is significantly different from the baseline period distribution. Specifically, Type B admissions decreased by 5.9 percent while Type E admissions increased by 5.9 percent compared to the baseline period.

The same pre-test and post-test comparisons for the control facilities indicate no significant differences in the admission patterns. It is interesting to note, however, that a decrease in Type B patient admissions among experimental facilities should be accompanied by an increase in Type B patients in control facilities. This is perhaps not surprising when it is remembered that, taken together, the treatment and control facilities accounted for about 70 percent of all Medicaid admissions in San Diego County. Type B patients required lighter care, and as experimental facilities reduced their intake, control facilities filled the void. In this case, the change among control facilities would appear to be as much the result of the intervention as any change among treatment facilities.

Aggregate measures of admissions

Although selected definitions of heavy-care patients were the focus of the admission incentive payments, the reimbursement system was modeled after a single graduated payment scale, so that movement towards a heavier-care case mix was encouraged throughout the Types B-E levels of care. As such, response to the incentive payments may be reflected in aggregate measures of admissions. The results for three such measures are given in Table 4 for the long-stay Medicaid admissions (Types B-E patients). Two of the measures (average ADL score and average admission payment rate) are directly related to the study design. The ADL score is an adaptation of the Katz scale, with patients given a 1 for each of the 6 activities of daily living for which they require help (*e.g.* a score of 4 meant that the patient was dependent in 4 ADLs) *(11)*. The average admission payment rate in effect weights each admission according to the reimbursement schedule set out in Table 1. The third measure, management minutes, is an estimate of the number of minutes of nursing care required by a patient during a 24-hour period for an assortment of conditions, problems, services, and treatments

Table 4. Average admission aggregate measures of Medicaid patient Types B-E[1] for the baseline period and two treatment periods, by experimental and control facilities (NCHSR Nursing Home Incentive Reimbursement Study).

Average admission aggregate measures	Baseline period, months 1-6		Treatment period, months 7-12			Treatment period, months 13-18		
	Experimental	Control	Experimental		Control	Experimental		Control
ADL score	5.0	5.0	5.1	**	4.9	5.2	**	5.0
Daily incentive-payment rate	$2.48	$2.19	$2.65	**	$1.70	$3.13	**	$1.73
Management minutes	173	169	169	**	151	172	**	151

[1]Admission type is established by assessing the patient's potential for discharge within 90 days, together with ADL dependencies and use of special services. See Table 1 for detail on the patient classification system used in the study. **Difference between experimentals and controls significant at the .01 level.
Source: National Center for Health Services Research and Health Care Technology Assessment. Long-Term Care Studies Program.

that go beyond the patient characteristics (*i.e.* ADL and special nursing services) used as the basis of the admission incentive payment *(12)*. The average management minutes time is estimated using data from the work measurement study that was done to create the incentive payment rates.

During the baseline period, patients in experimental and control facilities had the same average ADL score. The experimental facilities were somewhat higher on the other measures though the differences are not statistically significant (Table 4). During the two segments of the treatment period, the experimental facilities had a slightly higher average ADL score, a higher admission payment rate, and more management minutes than the control group (each difference was statistically significant at the .01 level). However, pre-test and post-test comparisons reveal that the differences (not shown) are as much due to a decrease in the average values in the control facilities as to an increase in the average values in the experimental facilities. These results again suggest that the admission decisions of experimental facilities may have affected the admission practices of the control facilities.

Multivariate results

Although the experiment was designed to compare a matched sample of facilities, perfect matching was not possible. Multivariate regression methods are used to estimate the net of the treatment effect resulting from controlling for differences between the experimental and control facilities before the intervention. These differences include the baseline value of the admission measure as well as measures on which the experimental and control facilities differed, including facility size and Medicaid admissions as a percent of total admissions during the baseline period. Other measures were explored, but were rejected because of negligible differences between experimental and control facilities, lack of significant effect, and problems of data quality. The unit of analysis is the facility and the focus is the number of Types B through E admissions, rather than the percentage during the two halves of the treatment period. Four facilities (three experimental and one control) that admitted fewer than 4 Medicaid patients during the entire treatment period are excluded from the regressions. These facilities were originally included in the study to see if the incentive system would encourage them to alter their preference for private-pay patients. The incentive payment system was unsuccessful in this regard and these facilities were removed to avoid outlier effects.

The regression results (Table 5) are very consistent with the earlier descriptive results. A statistically significant experimental effect is found for Type B patients (negative) during both halves of the experimental period and for Type E patients (positive) during the second time period. The results indicate that, during the second 6 months of the treatment period, the experimental facilities average a little more than 2 more Type E admissions than the control facilities. In the case of Type D patients, the treatment effect is not statistically significant during either period.

The regression results for the 3 aggregate admission case-mix measures are shown in Table 6. The experimental effect is statistically significant for all 3 measures during both periods, suggesting that the incentive payments encouraged more heavy-care patients to be admitted during the study than had been admitted previously. The regression results suggest

Table 5. Regression results for Medicaid patient Types B-E[1] admissions during two treatment periods (NCHSR Nursing Home Incentive Reimbursement Study).[2]

	Number of Type B Admissions	Number of Type C Admissions	Number of Type D Admissions	Number of Type E Admissions
Months 7-12				
Intercept	−3.18	−6.78	−7.09	−3.52
Experimental status[3]	−2.60*	−2.22	1.76	0.40
Baseline[4]	0.36	0.09	0.33	−0.04
Percent Medicaid[5]	5.32	11.49	11.58	3.90
Licensed beds	0.04**	0.09**	0.04	0.03**
Adjusted R^2 (N = 32)	0.64**	0.53**	0.73**	0.51**
Months 13-18				
Intercept	1.88	−1.98	−1.87	−4.39
Experimental status[3]	−3.54*	−1.47	−2.07	2.42*
Baseline[4]	0.40	0.27	0.63*	0.35
Percent Medicaid[5]	2.05	8.92	4.65	5.97*
Licensed beds	0.45	0.03	0.02	0.01
Adjusted R^2 (N = 32)	0.34*	0.48**	0.74**	0.54**

[1] Admission type is established by assessing the patient's potential for discharge within 90 days, together with ADL dependencies and use of special services. See Table 1 for detail on the patient classification system used in the study. [2] Four facilities (three experimental and one control) that admitted fewer than four Medicaid patients during the entire treatment period are excluded from this analysis. [3] The experimental status is represented by a dicotomous variable, with experimental facilities equaling one and control facilities equaling zero. [4] The outcome measures during the baseline period (months 1-6). [5] Medicaid admissions as a percent of total admissions during the baseline period. *Significant at the .05 level. **Significant at the .01 level.

Source: National Center for Health Services Research and Health Care Technology Assessment. Long-Term Care Studies Program.

that the incentive payments encourgaged per admission average ADL scores 0.2 to 0.3 points higher, average payment rates $1.06 to $1.28 higher, and average management minutes 15 to 18 higher in the experimental facilities than in the control facilities.

Case mix

Admissions have been the focus of the results presented so far. The case mix at any point in time, however, depends on the characteristics of patients discharged or reclassified as well as those admitted. In this section we examine the long-stay Medicaid case-mix distribution (Types B through E) for the experimental facilities at the beginning of the treatment period and at the end of each half of the treatment period (Table 7) to determine whether changes occurred during the study periods. Patient classification data were not collected for patients in the control facilities at the start of the study, so comparable case-mix data are not available for the control group.

The case-mix distributions are generally consistent with the admission results. By the end of the study the case mix in the experimental facilities was significantly different than at the start. Type B patients had become a smaller part of the case mix while Type C patients had increased significantly as a percentage of the Medicaid case mix. Type D patients declined while Type E patients increased as a percentage of case mix over the three periods but the changes were not large enough to be statistically significant.

Cost-effectiveness considerations

The admission incentive payments were designed to help relieve hospital backup of heavy-care patients who no longer need acute care. Reducing the hospital length of stay (LOS) of those patients is important because those days represent the major source of savings that could be used to fund the incentives. If savings from reduced hospital use are not at least equal to the amount spent to implement and administer the incentive system, the program may be viewed as simply another add-on to an already troublesome budgetary burden.

Hospital LOS patterns are difficult to interpret. For example, the potential change in the average hospital LOS of Type D patients admitted to the experimental nursing homes will be different if the nursing homes admit patients who recently became

Table 6. Regression results for Medicaid patient Types B-E[1] monthly admission aggregate measures during two treatment periods (NCHSR Nursing Home Incentive Reimbursement Study[2]).

	Average ADL score per admission	Average incentive payment per admission	Average management minutes per admission
Months 7-12			
Intercept	1.95*	2.51*	55.59
Experimental status[3]	0.33*	1.06*	17.70*
Baseline[4]	0.60**	0.61**	0.67**
Percent Medicaid[5]	−0.11	−2.05	−16.06
Licensed beds	−0.00	−0.01	−0.05
Adjusted R^2 (N = 32)	0.38**	0.38**	0.42**
Months 13-18			
Intercept	1.99*	−1.06	33.85
Experimental status[3]	0.22*	1.28**	14.78*
Baseline[4]	0.54**	0.44**	0.63**
Percent Medicaid[5]	0.14	1.53	5.32
Licensed beds	0.00	0.01	0.08
Adjusted R^2 (N = 32)	0.55**	0.54**	0.56**

[1] Admission type is established by assessing the patient's potential for discharge within 90 days, together with ADL dependencies and use of special services. See Table 1 for detail on the patient classification system used in the study. [2] Four facilities (three experimental and one control) that admitted fewer than four Medicaid patients during the entire treatment period are excluded from this analysis. [3] The experimental status is represented by a dicotomous variable, with experimental facilities equaling one and control facilities equaling zero. [4] The outcome measures during the baseline period (months 1-6). [5] Medicaid admissions as a percent of total admissions during the baseline period. *Significant at the .05 level. **Significant at the .01 level.
Source: National Center for Health Services Research and Health Care Technology Assessment. Long-Term Care Studies Program.

dischargeable from the hospital *versus* patients who had been dischargeable for an extended period. For Type D patients, by far the largest component of the heavy-care group, this is a moot point since the incentive system had little apparent effect on their admission patterns. For Type E patients, however, the hospital LOS data also are not encouraging. Even highly inflated assumptions about reductions in the hospital LOS, the cost of an administrative day in the hospital, and the net increase of Type E admissions associated with the incentive payments do not result in savings that match the $511,371 spent on incentives for Type E patients as of January 1985. (This figure includes $163,258 paid for Type E patients that were already in the experimental facilities at the start of the study. Those patients earned incentive payments for up to one year after the study began. New admissions to the experimental facilities earned incentive payments for a length of stay of up to four years.) For example, assuming that the average LOS for Type Es during the baseline period (56 days) could be reduced to the average for the light-care Medicaid patients (Types A through C, 26 days) and that each backup patient cost $300 per day in the hospital (the current payment rate for administrative days in California is $113.90), it would take a net increase of about 57 Type E admissions to break even. For the experimental facilities, the net increase of Type E admissions in the second half of the treatment period compared to the baseline period was 13. Compared to the control facilities during the second half of the treatment period, the experimental facilities had a net increase of 31 Type E admissions. By either estimate of the treatment effect, the incentive system clearly did not break even. The fact that facilities already take some Type E patients at the current payment rates limits the net effect of the intervention.

Summary and discussion

The major objective of the incentive reimbursement system tested in this experiment was to encourage skilled nursing homes to admit more public pay patients who might otherwise remain inappropriately hospitalized because they need more care than the average amount of care reimbursed by Medicaid. Two kinds of heavy-care patients (Type D and E) were the subject of the admission incentive payments. The results clearly show that by the latter part of the treatment period, experimental facilities

Table 7. Percent distribution of Medicaid case-mix by patient Types B-E[1] at the end of months 6, 12 and 18, for experimental facilities (NCHSR Nursing Home Incentive Reimbursement Study).

Case-mix patient types	End of month 6	End of month 12	End of month 18
B	31.8	30.9	27.6**
C	34.5	37.6	40.7**
D	28.8	27.0	26.3
E	4.8	4.5	5.4
Sample size	1,340	1,291	1,230
		$X^2 = 2.98$	$X^2 = 12.2$**

[1] Admission type is established by assessing the patient's potential for discharge within 90 days, together with ADL dependencies and use of special services. See Tabel 1 for detail on the patient classification system used in the study. **Difference between end-of-month 18 and end-of-month 6 percent distribution is significant at the .01 level.
Source: National Center for Health Services Research and Health Care Technology Assessment. Long-Term Care Studies Program.

were taking more Type E patients. The results also show that the incentive payment for Type D patients was not successful. This is particularily disappointing in that there were nearly three times more Type D admissions than Type E admissions during the treatment period.

The reasons for the failure of the Type D incentive are not clear, but several possible explanations can be suggested. First, the absolute financial value of a Type D incentive was less than that of most Type E patients. The incentive for Type D patients was $4.96 and the incentives for Type E patients ranged from $3.43 to $26.65, with a mean of $12.31. In principle, Type E patients brought very little more in incentive payments. All incentives were based on the incremental cost of caring for the patient (as compared to the break-even Type C patient) plus a 5 percent profit. However, it seems likely that facilities took more notice of the absolute levels of payment and the differentials between payments than they did of the theory. Also, to the extent that they were caring for patients with existing staff rather than hiring new staff, it was rational to take those patients for whom the incentive payment was greatest. Some staffing data were collected near the beginning and end of the treatment period. Although the data cannot capture staffing fluctuations, a comparison of these two points in time suggests that there was no change in the staffing patterns of the experimental facilities.

Another explanation for the success of the admission incentive for Type E patients may have to do with understanding the incentive system *(13)*. Type E patients were more easily identifiable because of the need for special nursing care services associated with these patients (*i.e.* tube feeding, decubitus care, or comatose care). Type D patients, however, are only distinguished on the basis of needing assistance in all 6 activities of daily living rather than being somewhat less dependent. A patient being comatose, or being fed by tube or having decubitus ulcers, is much more specific and ascertainable than an ADL score.

The problems emphasized by the outcome incentives also may have encouraged the experimental facilities to concentrate on admitting Type E patients. Half the outcome incentives were specifically designed for special nursing services and facilities attempted to earn these payments in a substantial number of cases.

It is interesting to note the erfect of the incentive for Type B patients. When the experiment was first presented to the San Diego nursing homes, it was expected that the Type B patients would be the break-even patient and reimbursed at a zero rate. Subsequent to the work measurement studies during the baseline period and the calculation of incentive payment rates, the facility administrators were informed that Type C patients were break-even patients and that there would be a negative payment for Type B patients. This was a matter of considerable concern for some facilities, and it is possible that it was the negative character of this incentive that made the impact. If the incentive for Type B patients had been zero, but the absolute differences between the rate of payment for Types B through E patients had been maintained, the effect might not have been as strong. Some facilities, however, did start "in the hole" because of an on-board Type B population that was not balanced by Types D and E patients. This could have affected their interest in active participation.

Although results vary somewhat depending on the admission measure used, it is generally the case that only a small subset of the facilities responded

strongly to the incentive scheme. In most cases the response was modest and in some cases the proportion of heavy care patients was actually smaller during the treatment period than during the baseline period. In the case of incentive for Type E patients, during the last segment of the treatment period five facilities responded relatively strongly, increasing their Type E admission proportion by between 10 and 20 percent compared to the baseline period distribution. The success of the incentive for Type E patients may also stem from the fact that only three facilities took fewer Type E patients during the treatment period than during the baseline period. However, half of the treatment facilities took a lesser proportion of Type D patients in the last segment of the treatment period than during the baseline period.

An intriguing result is the change in ADL score. Only one facility had a lower average ADL score for admissions during the last six months of the treatment period than during the baseline period; for the remaining facilities the increase ranges from .07 to .81. This raises the possibility that facilities may have intended to take more heavy-care patients and may actually have succeeded in doing so, but that their imperfect knowledge of the incentive structure means that this behavioral change is understated in analyses using only Type D and E admissions as the key outcome measures. This possibility is supported by the results for the aggregate measures of case mix, which show that the intervention increased the admission of heavier care Medicaid patients in the experimental facilities. The down side of this increase in heavy-care admissions is that it may have been accomplished by balancing the case mix with a higher percentage of non-Medicaid (mostly private pay) admissions. During the study non-Medicaid patients increased in the experimental facilities as a percentage of both admissions (from 59.1 percent during the baseline period to 66.0 percent in the second half of the treatment period) and case mix (from 37.1 percent at the end of the baseline period to 40.0 at the end of the treatment period). The 6.9 percentage point increase in non-Medicaid admissions to the experiment facilities is slightly higher than the 6.6 percentage point increase in non-Medicaid admissions to the control facilities (from 34.9 percent during the baseline period to 41.5 percent in the second half of the treatment period). Comparable case-mix percentages for control facilities are not available.

Conclusions

The results of the experiment are encouraging for case-mix-based incentive reimbursement, with some reservations. The incentive payments influenced nursing homes to admit a generally more dependent group of patients. Among the heaviest care patients, however, success was limited to the relatively small group of patients needing special nursing services.

At the time of the experiment (1981 and 1982), case-mix reimbursement was still a relatively new approach. With the advent of DRG reimbursement for hospitalized Medicare patients, however, nursing homes have become acutely aware of case-mix-based reimbursement. They are concerned about the possible impact on their own case mix, given the incentives for hospitals to discharge patients quickly *(14)*, and they also are interested in the possible advantages to themselves of a case-mix-based reimbursement system for nursing home care. It may well be that, in the time since the experiment, the nursing homes have become substantially more receptive to the kind of system studied here, and if a similar experiment were to be undertaken in the post-DRG environment, it would generate a stronger response among nursing homes.

Future efforts, however, will have to devote additional attention to several intricate design questions. The problem experienced in identifying the break-even patient is a good example of the complexity of trying to reimburse on the basis of patient-specific, case-mix characteristics *(15,16)*. Seemingly reasonable assumptions can turn out to be incorrect because patient characteristics are not as homogeneous as we need to assume. An example of this is the exclusion of Type A patients from any of the incentives because they were expected to be dischargeable in 90 days. As it turned out, about 40 percent of all Type A admissions remained in the nursing home for more than 90 days and a considerable number stayed more than a year.

Information on the characteristics of private pay patients is also needed if we hope to use the Medicaid reimbursement system to encourage better access for public pay patients. During the treatment period the admission of non-Medicaid patients increased in the experimental facilities in spite of the incentive payments. If there is an abundance of private pay patients willing and able to pay a premium for access to the limited supply of nursing home beds, incentive reimbursement can only be expected

to increase access for heavy-care, public-pay patients if they produce competitive profits. In this case it is not enough to pay the incremental costs plus some profit. The reimbursement rates for heavy-care, public-pay patients must reflect the profit opportunities in the private-pay market if the goal is to increase access for those patients.

Finally, for some states the feasibility of the approach tested in this study may depend on identifying the patient characteristics associated with the hospital backup problem. From a recent analysis of some of the San Diego data in the context of the hospital length-of-stay criteria used in the new DRG-based Medicare prospective payment system, it appears that the various characteristics used in the experiment for targeting special reimbursements are indeed associated with longer hospital stays *(14)*. The fact remains, however, that many patients with the same characteristics do not have unusually long hospital stays. Also, the San Diego nursing homes were already admitting a significant number of heavy-care patients. During the baseline period, Type D and E patients comprised 16.4 percent of all admissions to the 36 facilities (43.2 percent of the long-stay Medicaid admissions). The net effect of the intervention, therefore, had to be substantial to compensate for the fact that the reimbursement incentives were paid for some heavy-care patients who would have been admitted without the incentives.

To be successful in the sense of spending money on nursing home admission incentives to save money on hospital days, further research is necessary to identify special classes of subacute patients not currently being admitted by nursing homes who could be admitted safely to a nursing home if increased reimbursements are provided. To the extent this is possible, the extra dollars spent to encourage nursing homes to admit and care for those patients can be directly offset by reductions in the more expensive acute care days. However, the data from this experiment show that if such a program is possible, it will only address a relatively limited component of the hospital backup problem.

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